TRANSLATOR'S STATEMENT

Assistant Commissioner for Patents,
Washington, D.C.

Sir:

I, Sigrid Sommerfeldt, declare:

That I am thoroughly familiar with the German and English languages;

That I am competent to serve as a translator of German documents into English;

That the attached document represents a true English translation of International application PCT/EP2003/013307, filed November 26, 2003.

Signed this 25 day of November, 2005.

Sigrid Sommerfeldt

Translator

Method and device for the application of a textile auxiliary during the solidification of geotextiles by means of a hydrodynamic solidification method

The invention relates to a method and a device for the application of a textile auxiliary, essentially a finishing step (avivage), during the solidification of geotextiles by means of a hydrodynamic solidification method.

The use of textile auxiliaries, a so-called avivage, during the solidification of nonwoven fabrics comprised of staple or continuous fibers, is known.

Such textile auxiliaries decrease the friction between the fibers and thus permit defined and improved solidification of the nonwoven fabrics.

These textile auxiliaries, independently of the applied solidification method, whether mechanical solidification by needling or hydrodynamic solidification, are conventionally applied onto the fibers to be solidified and effectively act on the surface of the fibers as an oiling agent for the easier and low-friction penetration of the needles during the needling process or also for the easier gliding of the fibers in the hydrodynamic solidification processes.

Hydrodynamic solidification methods are known and, for example, described by example for various fiber types in EP A 0 896 080, EP A 101 064, EP A 0 900 295, EP A 0967 315, EP A 0 859 076, EP A 0 841 424, EP 0 727 517 and EP A 0 751 249.

To reduce the fiber/fiber friction and to attain uniform solidification, the textile auxiliary, according to the view currently held by persons of skill in the art, must be applied onto the surface highly uniformly and with sufficient area coverage in order to ensure consistent results.

The aim of the invention is providing a method for applying the textile auxiliary during the solidification of nonwoven fabrics by means of a hydrodynamic method, in which the desired effect of the textile auxiliary occurs without complicated and costly application methods and uniform solidification can be achieved.

It was unexpectedly found that the application of the textile auxiliary can take place with excellent uniformity and without loss of effect through the simple addition of metered doses of the textile auxiliary to the water jet.

Subject matter of the invention is therefore a method for the application of a textile auxiliary during a hydrodynamic solidification method, characterized in that the textile auxiliary is added in metered doses directly into the fluid utilized for the hydrodynamic solidification before the fluid is ejected from the high-pressure capillaries. The addition of the metered textile auxiliary is preferably carried out during the low-pressure step of the process.

Suitable textile auxiliaries are known to the person of skill in the art and are commercially available. All textile auxiliaries known for the avivage of fibers can be employed.

The textile auxiliary is introduced directly into the fluid and not onto the surface of the nonwoven material to be solidified. Together with the fluid the textile auxiliary is transported uniformly into, onto and through the fiber structure to be solidified. Due to the fluid discharge with the moist product, doses of the fluid as well as also of the textile auxiliary must be continuously added in order for the fluid quantity as well as also the concentration of the textile auxiliary to remain constant. Checking and correcting the concentration is readily possible by measuring the index of refraction.

It was unexpectedly found that, in contrast to the view held until now by persons skilled in the art, through the metered addition of the textile auxiliary into the fluid utilized for the hydrodynamic solidification, uniform and improved solidification can be attained.

The quantity of the added textile auxiliary is a function of the composition of the textile auxiliary, the process parameters of the hydrodynamic solidification and of the type of the nonwoven fabric, in particular of the fiber properties, the fiber texture and of the properties which the nonwoven material is to have after it has been solidified.

The nonwoven fabric may be comprised of staple or continuous fibers. The fibers are preferably comprised of synthetic material, such as for example polypropylene, polyethylene, polyamide,

polyester or of mixtures thereof.

The nonwoven materials can also include comprise bi-component fibers or be entirely comprised of such fibers.

However, the nonwoven materials can also include proportions of natural fibers, such as cellulose, hemp, sisal, coconut fibers, kenaf and the like.

The fibers can each have a different texture and/or fiber cross section.

Several nonwoven fabrics can also be bonded with one another and solidified utilizing the method according to the invention.

For this purpose two or more non-solidified or pre-solidified nonwoven fabrics are laid down one above the other and subsequently bonded with one another through a hydrodynamic solidification method while metered doses of the textile auxiliary are added.

For carrying out the method, the selected textile auxiliary is preferably provided in a recipient vessel and via a supply line continuously introduced into the water jet system of the hydrodynamic solidification device. The metering device is preferably located on the recipient vessel. In general, infinitely variable dosing pumps controlled via a suitable control device are utilized for regulating the inflow. The uniform distribution of the textile auxiliary in the fluid is ensured by a mixing device.

Due to the described method a uniform, a stronger and adjustable solidification of the nonwoven fabric through hydrodynamic processes can be attained in simple manner.

Example 1

A nonwoven fabric produced with the spun lace process and comprised of polypropylene granulate was solidified hydrodynamically, wherein in the first sample no textile auxiliary was added to the water circulation, however, in the second sample a textile auxiliary had been added in metered doses.

	Sample 1	Sample 2
Concentration of avivage in the water circulation, in %	0	0.3
Weight/unit area of the geotextile, g/m^2	152	149
Wide width tensile strength (EN ISO 10319) longitudinal, N transverse, N	 1856 1790	 2235 2220
Plunger puncture resistance (EN ISO 12236, N)	1277	1850

Example 2

Two geotextiles of polyester granulate (PET) were produced analogously to Example 1

	Sample 1	Sample 2
Concentration of avivage in the water circulation, in %	0	0.1
Weight/unit area of the geotextile, g/m^2	95	97
Wide width tensile strength (EN ISO 10319) longitudinal, N transverse, N	 1266 1235	 1480 1510
Plunger puncture resistance (EN ISO 12236, N)	978	1195